

Smartio CP-168U User's Manual

Smartio 8-Port RS-232 Serial Board for PCI Bus

First Edition, February 2003



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Smartio CP-168U User's Manual

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1

Introduction

Overview

Smartio—The Smart Multiport Async Solution

The term *Smartio* stands for *smart multiport serial I/O* solution. The *Smartio* CP-168U board is designed for the 32-bit PCI bus with Plug and Play feature. This board offers 8 RS-232 serial ports for connecting terminals, modems, printers, scanners, cash registers, bar code readers, keypads, numeric displays, electrical scales, data acquisition equipment, and many other serial devices for the PC and compatible systems. With its well-designed and fine-tuned device driver, the *Smartio* boards make full use of the 64 byte Tx/Rx FIFO and on-chip H/W flow control, which makes possible transferring data without loss at transmission speeds up to 230.4 Kbps. These boards offer a reliable and high performance solution for serial multiport communications.

Board Applications

The CP-168U board can be used with many applications, including:

- Internet/Intranet Connections
- Remote Access Applications
- Multi-user Applications
- Industrial Automation
- Office Automation
- Telecommunications
- PC-based Vending Machines or Kiosk Systems
- POS (Point-of-Sale) Systems

PCI Solution

The CP-168U board complies with PCI Spec. 2.1, and does not use either switches or jumpers. The hardware configuration for the IRQ and memory addresses is automatically assigned by the PCI BIOS. Hence, the board **MUST** be plugged in before installing the driver software. For more PCI information, refer to the Technical Reference Appendix.

Surge Protection

To prevent the board from being damaged by lightning or high potential voltage, embedded 16 KV ESD protection is used in the CP-168U board. This is required for harsh environments, such as in factory settings, under severe weather conditions, such as lightning, or other high interference situations.

Operating System Support

The CP-168U board supports Windows NT/2000/XP, Windows 95/98, and Linux. You may access Moxa's website at www.moxa.com for a more detailed installation guide.

MOXA Serial Comm Tool

For application development, MOXA provides an easy-to-use serial communication library (*PCComm*) under Windows NT/2000/XP and Windows 95/98. With this library, it is easy to develop your own applications using sample applications developed with Visual Basic, Visual C++, Borland Delphi, etc. Utilities such as diagnostic, monitor, and terminal emulation are also included for debugging and monitoring communication status, terminal emulation, and file transfer.

Features

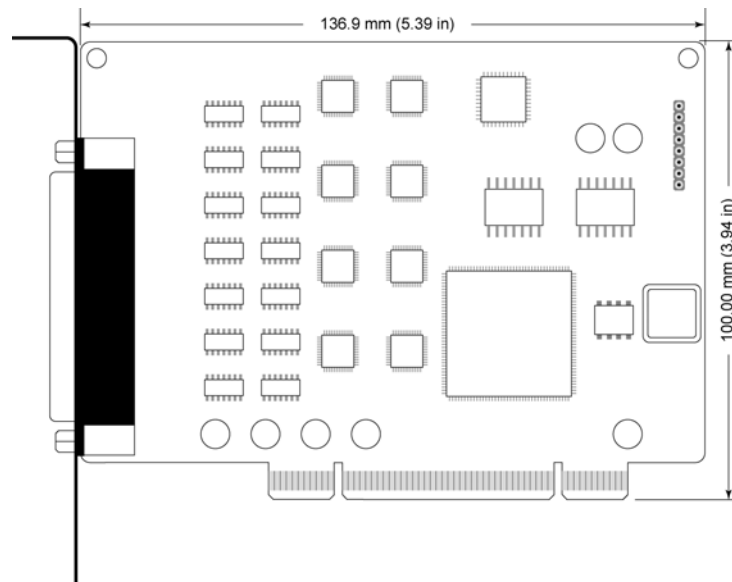
The *Smartio* CP-168U board has 8 RS-232 ports, embedded ESD 16 KV surge protection, and uses a Moxa or 16C550C compatible UART, and has the following important features:

- Supports universal PCI, plug and play (no switches or jumpers)
- Fits both 3.3V and 5V connector key
- Reliability—high speed Moxa UART Communication Controllers with on-chip hardware flow control to guarantee no data loss
- Compact half-size design
- Embedded ESD 16V surge protection
- Easy installation—32-bit PCI bus with Plug and Play capability
- Powerful Serial Comm tool—PComm
- Broad OS support—Windows NT/2000/XP, Windows 95/98, Linux

Package Checklist

You should find the following items in the *Smartio* CP-168U board package:

- Smartio CP-168U 8-port serial board
- Software CD that contains drivers for Windows NT/2000/XP, Windows 95/98, and Linux.
- Smartio CP-168U User's Manual (this manual)



Installation Guide

This section gives a brief summary of how to install the Smartio CP-168U board under each supported operating system. The installation is simple and involves the following stages:

Check the PCI BIOS settings.
Install the *Smartio* CP-168U board.

See Chapter 2, “**Hardware Installation.**”



Install the software from the software CD. Configure the driver for the board and ports.

See the respective OS section in Chapter 3, “**Software Installation.**”



Connect the devices with the cable.

See Chapter 5, “**Connection Cables and Cable Wiring,**” for cable wiring.



Restart the system.
Check the driver initialization status.

If the system restarts successfully, you may develop your applications or execute the desired applications.

See Chapter 3, “**Software Installation,**” for board init. status.

See Chapter 4, “**Serial Programming Tools.**”

2

Hardware Installation

The installation of the *Smartio* CP-168U board involves both hardware and software. Software installation is discussed in the next chapter. In this chapter, we discuss hardware installation.

The no-switch-no-jumper *Smartio* CP-168U board's IRQ number and I/O addresses are assigned automatically by the PCI BIOS. For this reason, the board **MUST** be plugged in before installing the driver software.

Installing the *Smartio* CP-168U board

Step 1: Power off the PC.

<p>Warning! To avoid damaging your system and board, make sure your PC's power is switched off before inserting this or any other board into an empty PCI slot.</p>
--

Step 2: Remove the PC's cover.

Step 3: Remove the slot cover bracket if one is in place.

Step 4: Insert the *Smartio* CP-168U control board firmly into a free 32-bit PCI slot.

Step 5: Fasten the holding screw to fix the control board in place.

Step 6: Replace the PC's cover.

Step 7: Power on the PC; the BIOS will automatically set the IRQ and I/O address.

Note!

Each board must occupy one unique IRQ and four 8-byte I/O addresses, which are assigned automatically by the PCI BIOS.

However, you can select a free IRQ number manually via the PC's BIOS setup for the PCI slot, but normally this method is not available for the I/O address. The possible IRQ numbers are 2, 3, 4, 5, 7, 10, 11, 12, and 15. The possible I/O addresses are from 0x0000 to 0xFFFF.

Step 8: Proceed with the software installation, as described in the next chapter, "Software Installation".

3

Software Installation

In this chapter, the driver software installation, configuration, and driver update/removal procedures are described for various operating systems, including Windows NT, Windows 95/98, and Windows 2000/XP. Before proceeding with the software installation, be sure to first complete the hardware installation discussed in the previous chapter.

Refer to the next chapter, “Serial Programming Tools,” for information on developing your own serial programming applications.

Windows NT, Windows 95/98, Windows 2000/XP, and Linux drivers can be downloaded from the Moxa website.

Windows NT

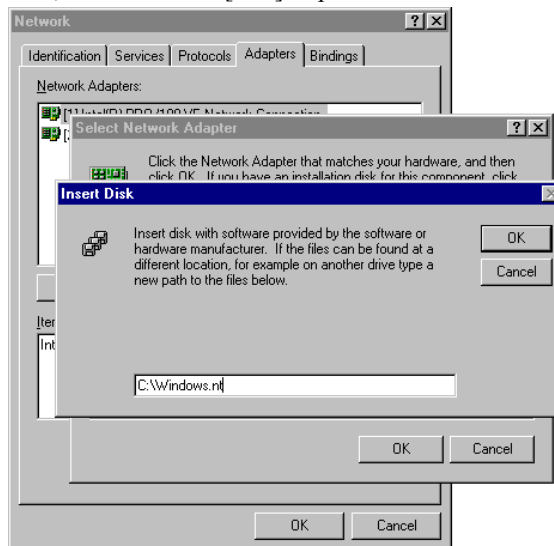
Windows NT supports up to 256 serial ports, from COM1 to COM256. To fully utilize Windows NT’s multi-process and multi-thread advanced features, pure 32-bit Windows NT device drivers were developed for the *Smartio* CP-168U board and other MOXA multiport boards. The drivers conform to the Win32 COMM API standard.

Installing the Driver

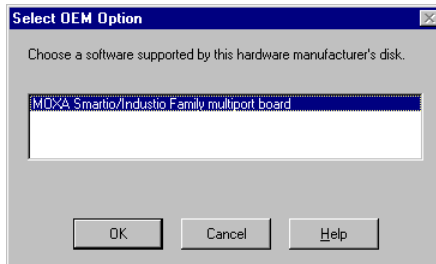
First Time Driver Installation

The following procedure shows how to install the *Smartio* CP-168U driver for the first time. First make sure the board or boards are already plugged into the system's PCI slot(s).

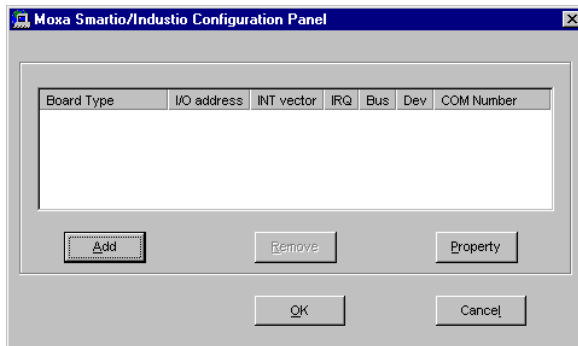
1. Log into NT as Administrator.
2. Copy the folder **Windows.nt** located under **Software\WinNT\W5.7** on the software CD, to your computer's hard disk (under the C: drive, for example).
3. Open the [Control Panel], click the [Network] icon, and then select the [Adapters] tab.
4. Click the [Add] button, and then the [Have Disk...] button in the [Select Network Adapter] dialog box.
5. Specify the exact path of the driver diskette, **C:\Windows.nt** in the example shown here, and then click [OK] to proceed.



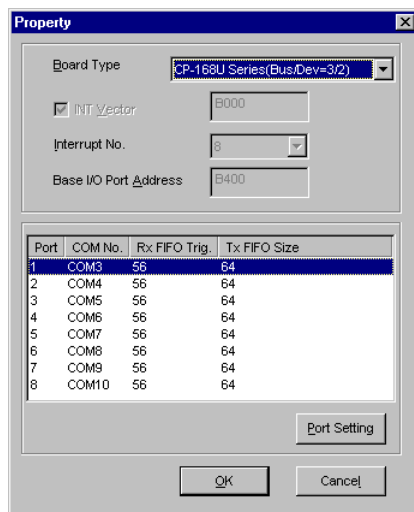
6. Select **MOXA Smartio/Industio Family multiport board** in **Select OEM Option** dialog box, and then click [OK] to start installing the driver.



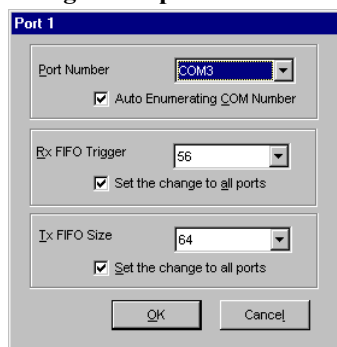
7. The Moxa Smartio/Industio Configuration Panel dialog box appears. Click the **[Add]** button to open the **Property** dialog box to change port settings and advanced FIFO configuration done automatically by the system.



8. Select the just installed CP-168U board from the **Board Type** pull-down list, click on a specific port item, and then click on the **[Port Setting]** button to open the **Port X** window.

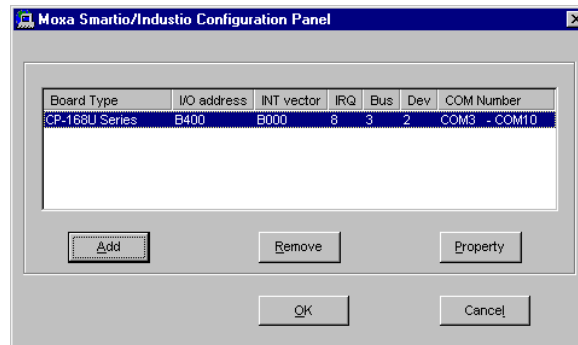


9. Select a COM number for the specific port from **Port Number** pull-down list.
10. Check the **Auto Enumerating COM Number** check-box to have subsequent ports mapped to continuous COM numbers. For example, if COM3 is assigned to Port 1, then COM4 will be automatically assigned to Port 2.
11. Select an Rx FIFO Trigger from the **Rx FIFO Trigger** pull-down list. Rx FIFO trigger levels of from 1 to 62 are available, with a default value of 56 bytes. Check the **Set the change to all ports** check-box to apply the just defined Rx FIFO Trigger to all ports.
12. Select a Tx FIFO Size from the Tx FIFO Size pull-down list. Tx FIFO sizes are available from 1 to 64 bytes, with a default value of 64 bytes. Check the **Set the change to all ports** check-box to apply the just defined Tx FIFO Size to all ports.



13. Click [OK] in the **Port X** dialog box to confirm the port settings, and then click [OK] in the **Property** dialog box to complete the port settings and return to the **MOXA Smartio/Industio Configuration Panel** dialog box. The configured CP-168U board

will now appear in the MOXA Smartio/Industio Configuration Panel dialog box, as shown below.



14. Click [OK] in the **MOXA Smartio/Industio Configuration Panel** to return to the Network dialog box, and then click [OK] to exit the **Network** dialog box.
15. Restart the PC.

Note! The driver configuration will NOT take effect until you restart the PC.

Note! Double check that all *Smartio* CP-168U board components—the control board—are connected and fastened tightly to make sure that the system and the driver can start up successfully.

Once the system restarts, you may check the event log issued by the MOXA driver to see if the board's ports have been initialized successfully.

Enter the [Administrative] group, click the [Event Viewer] icon, and then select [Log] and [System] to check a message similar to “**MOXA CP-168U board, with first serial port COM3, has been enabled**” for each newly configured board.

Note! If an error message similar to “**Cannot find any configured MOXA Smartio/Industio series board!**” pops up, refer to the **Troubleshooting** chapter for possible solutions.

Once the board and the driver are installed and the driver restarts successfully, you can start

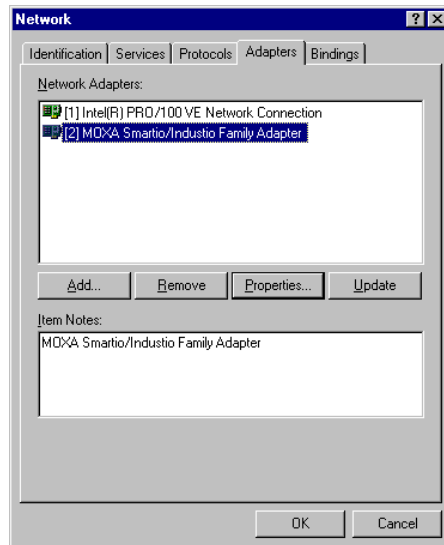
to develop applications with the *PComm* library (see “**Serial Programming Tools**”) or the Microsoft Win32 API. You can also use applications such as Terminal Emulator (see “**Serial Programming Tools**”), a *PComm* utility, or HyperTerminal, to transmit/receive data, as well as Remote Access Service to provide dial-up networking capabilities.

Configuring the Board and Ports

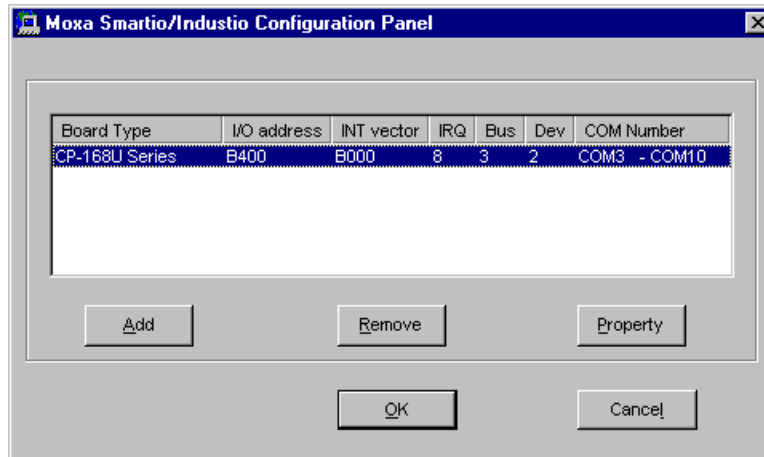
Re-Configuring Port Settings

If the driver is already installed, and you only wish to re-configure the ports, refer to the following procedures. In addition to the procedures listed below, you may also click on [Start] → [Programs] → [MOXA Utility] → [MOXA Smartio/Industio Configuration Panel] → [Property], and then refer to the instructions in the previous section, “**First Time Driver Installation.**”

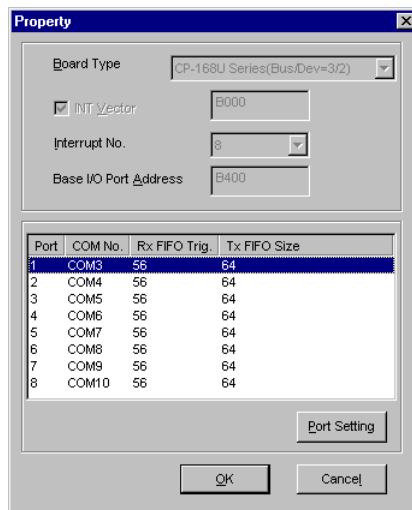
1. Open the [Control Panel], click on the [Network] icon, and select the [Adapters] tab.
2. Click on MOXA Smartio/Industio Family Adapter from the Network Adapters list to highlight it, and then click on [Properties] to open the **MOXA Smartio/Industio Configuration Panel** dialog box to change port settings and advanced FIFO configuration.



3. Click on [Property] from the MOXA Smartio/Industio Configuration Panel to open the Property window.



- Next, refer to the instructions given in the previous section, “**First Time Driver Installation**” from the “**Windows NT**” section.



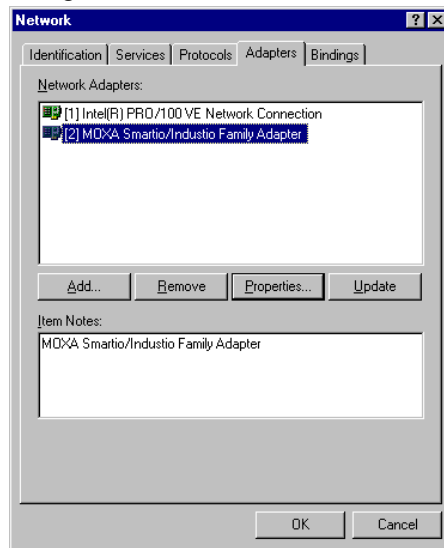
Configuring Another CP-168U Board

In this section, we explain how to configure another MOXA CP-168U board that is already installed. Up to four CP-168U boards can be installed in one system under Windows NT, provided sufficient system resources are available.

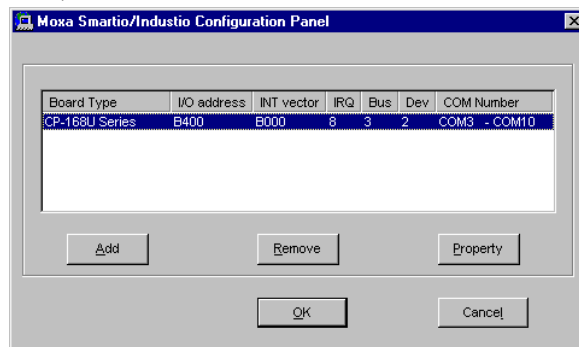
In addition to the procedures listed below, you may also click on [Start] → [Program] → [MOXA Utility] → [MOXA Smartio/Industio Configuration Panel] → [Add], and then

refer to the instructions from the previous section, “Installing the Driver.”

1. Open the [Control Panel], click on the [Network] icon, and select the [Adapters] tab.
2. Click on **MOXA Smartio/Industio Family Adapter** from the **Network Adapters** list.
3. Click the [Properties] button to open the Moxa Smartio/Industio Configuration Panel dialog box.



4. Next, refer to the instructions from the “First Time Driver Installation” subsection.



Removing an Existing CP-168U Board Configuration

First shut down your PC, and then physically remove the CP-168U board from the PCI slot. The next time you start up the PC, the system will automatically remove the configuration. There is no need to click the Remove button in the Moxa Smartio/Industio Configuration

Panel dialog box.

Updating the Driver

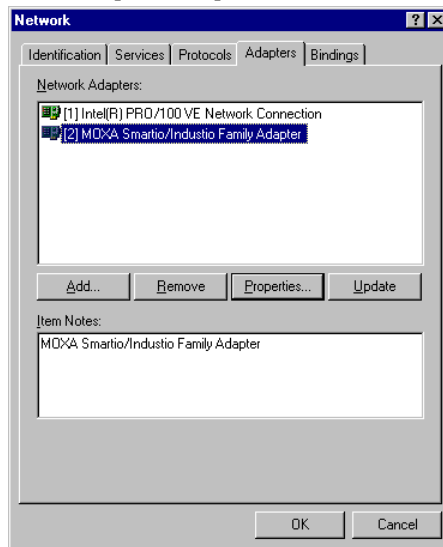
Take the following steps to update the *Smartio* CP-168U board driver.

1. Open [**Control Panel**], click on the [**Network**] icon, and select the [**Adapters**] tab.
2. Click on MOXA Smartio/Industio Family Adapter from the Network Adapter list.
3. Click the [**Remove**] button in the **Network** dialog box.
4. Click the [**Close**] button in the **Network** dialog box.
5. Restart the system.
6. Refer to the instructions given in the “**First Time Driver Installation**” section to install the new driver.

Removing the Driver

To remove the *Smartio* CP-168U board driver:

1. Open the [**Control Panel**], click on the [**Network**] icon, and select the [**Adapters**] tab.
2. Click on **MOXA Smartio/Industio Family Adapter** from the **Network Adapters** list.
3. Click the [**Remove**] button in the **Network** dialog box.



4. Click the [**Close**] button to exit the **Network** dialog box.
5. Restart the system to activate the new configuration.

Windows 95/98

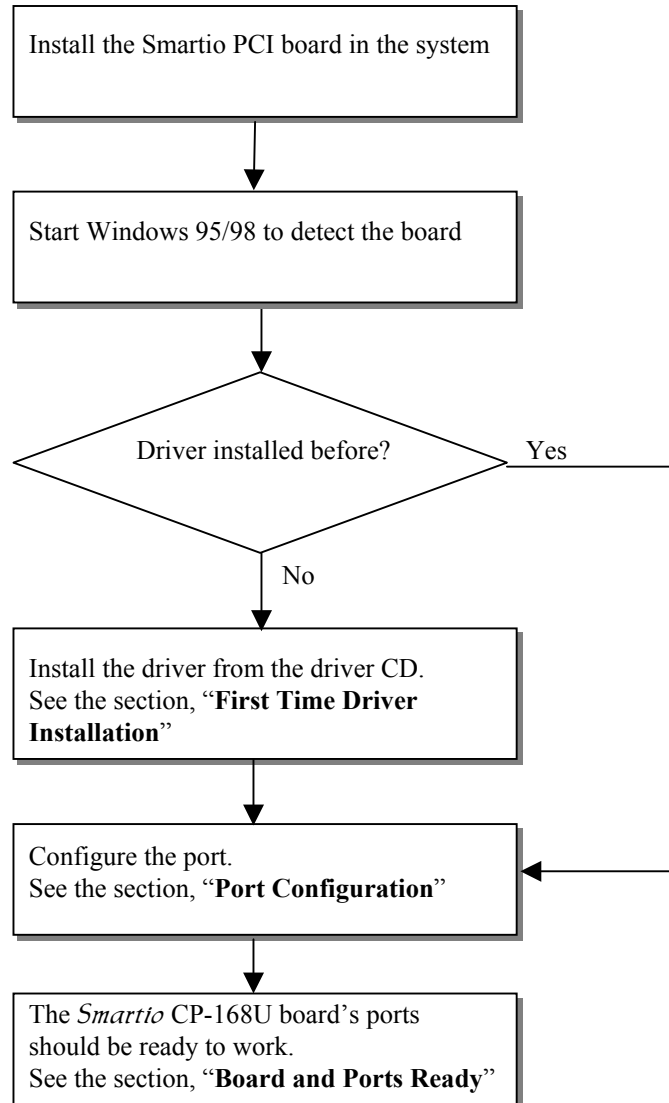
The Windows 95/98 driver supports up to 128 serial ports, from COM1 to COM128. To fully utilize the advanced multi-process and multi-thread features of Windows 95/98, pure 32-bit Windows 95/98 virtual device port drivers (VxD) compliant with communication drivers (VCOMM) have been developed for the *Smartio* CP-168U and other MOXA multiport boards. The drivers conform to the Win32 COMM API standard.

Installing the Driver

Thanks to Windows 95/98's Plug and Play capability, you can easily plug the *Smartio* CP-168U board into an available PCI slot, and then get to work right away with very little installation effort. Windows 95/98 will automatically detect the presence of the new board, and prompt you to install the software driver. You simply need to have the driver CD available to complete the installation process.

A maximum of 4 *Smartio* CP-168U boards can be installed in one system, provided sufficient I/O address and IRQ number resources are available.

The following flow chart illustrates the driver installation stages of the *Smartio* CP-168U boards. Each stage will be discussed later in more detail.



First Time Driver Installation

This stage gives the steps for installing the *Smartio* CP-168U board driver for the first time. The installation of the *Smartio* CP-168U board for Windows 95 and Windows 98 are slightly different and will be described in two columns. Follow the steps in the left column

for Windows 95 or the right column for Windows 98.

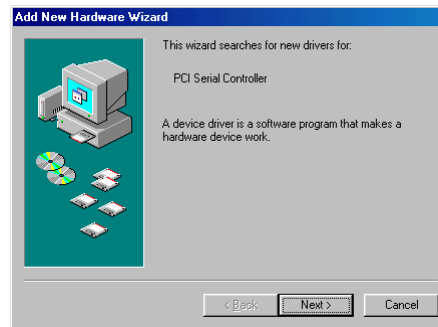
If one MOXA CP-168U board was previously installed and another MOXA CP-168U board is plugged in, the system will prompt you to skip this stage, and take care of Port Configuration, which is discussed in the next section.

1. Upon detecting the first new *Smartio* CP-168U Series board, Windows 95/98 will automatically display a **New hardware found** message box, and then display the following dialog boxes. Click the **Next** button to proceed.

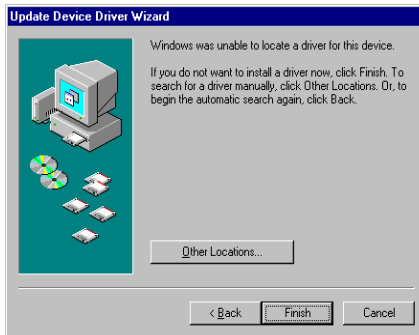
Windows 95



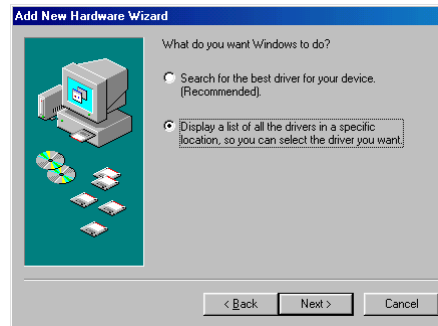
Windows 98



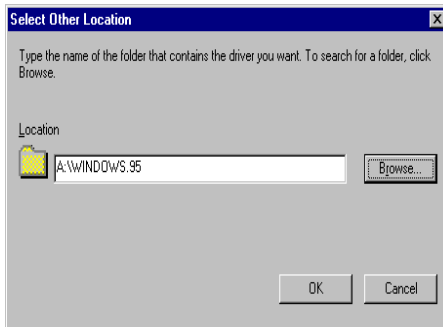
2. Click on **[Other Locations]**.



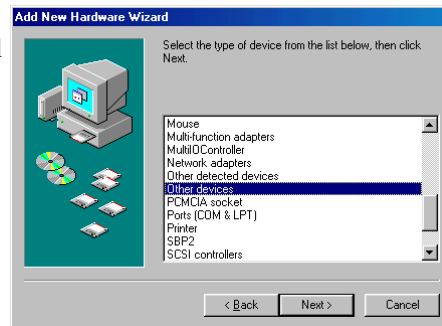
2. Select **[Display a list...]** and then click on **[Next]**.



3. Type E:\Software\Win9x\V5.7\Windows.95 in the **Location** input box, and then click **[OK]** from the **Select Other Location** window. The system will start reading the files from the CD.



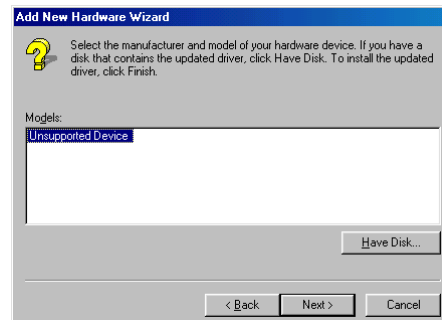
3. Select **Other Devices** and then click on **[Next]**.



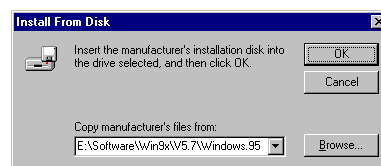
4. Click on **[Finish]**.



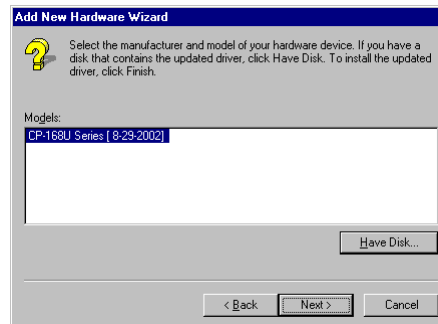
4. Click on **[Have Disk]**.



5. Type E:\Software\Win9x\V5.7\Windows.95 and click **[OK]**. The system will start reading the files from the CD.



6. Click on [Next].



7. Click on [Next].

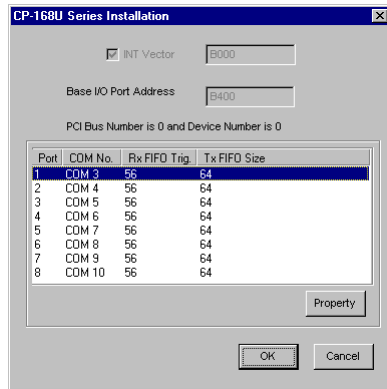


Port Configuration

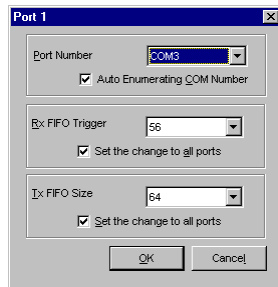
After the driver is installed, the MOXA CP-168U Installation dialog box will be displayed, and the system will map the ports automatically.

If one MOXA CP-168U board was installed previously, and another MOXA CP-168U board is added, the system will prompt you to take care of port configuration, which is discussed in this section.

1. Click on a specific port from the the **CP-168U Series Installation** window, and then click on [**Port Setting**] to open the **Port X** dialog box.



2. Select a COM number for the port from the **Port Number** pull-down list.
3. Check the **Auto Enumerating COM Number** check-box to have subsequent ports mapped to continuous COM numbers. For example, if COM 3 is assigned to Port 1, then COM 4 will be automatically assigned to Port 2.
4. Select an Rx FIFO Trigger from the Rx FIFO Trigger pull-down list. Rx FIFO trigger levels from 1 to 62 bytes are available, with a default value of 56 bytes. Check **Set the change to all ports** check-box to apply the just defined Rx FIFO Trigger to all ports.
5. Select a Tx FIFO Size from the Tx FIFO Size pull-down list. Tx FIFO sizes from 1 to 64 bytes are available, with a default value of 64 bytes. Check **Set the change to all ports** check-box to apply the just defined Tx FIFO Size to all ports.



6. Click **[OK]** in the **Port X** dialog box to confirm the port settings, and then click **[OK]** in the **Property** dialog box to complete the port settings.

Board and Port Ready

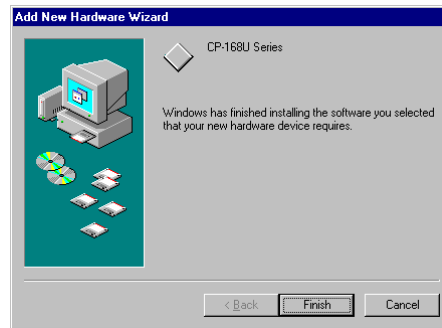
Board and Port Ready for Windows 95 and Windows 98 are slightly different. In finishing this stage, the driver installation will be complete.

Windows 95

After the port configuration, you can immediately use the COM ports of the *Smartio* CP-168U board without restarting Windows 95.

Windows 98

After the port configuration, click on [**Finish**]. The COM ports of the *Smartio* CP-168U board can be used without restarting Windows 98.

**Note!**

If an error message similar to “CP-168U board(BusNo=x, DevNo=x, Port1=COMx) interrupt number is invalid!” pops up, refer to the “**Troubleshooting**” chapter for solutions.

If you want to add more boards after installing the driver, simply plug the additional *Smartio* CP-168U board into an empty PCI slot, and Windows 95/98 will automatically detect the newly plugged board. Skip to Port Configuration to take care of port settings.

This completes the installation of the *Smartio* CP-168U board driver, including board and port configuration. However, if you need to make changes to the board and port configuration, refer to the next section, “Configuring Board and Port,” for configuration details.

Once the board and the driver are installed and the driver restarts successfully, you can start to develop applications with the *PComm* library (see “Serial Programming Tools”) or the Microsoft Win32 API. You can also use applications such as Terminal Emulator (see “Serial Programming Tools”), a *PComm* utility, or HyperTerminal, to transmit/receive data, as well as Remote Access Service to provide dial-up networking capabilities.

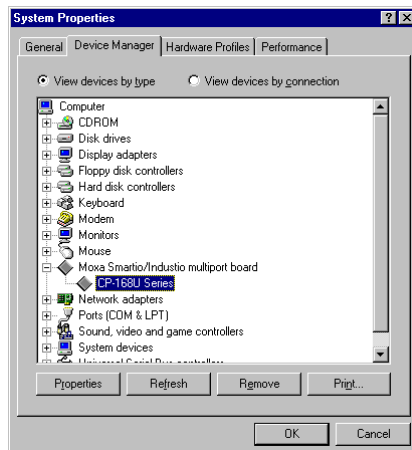
Configuring the Board and Ports

Follow the procedures given below to re-configure the COM number for the ports of installed boards and drivers under Windows 95/98.

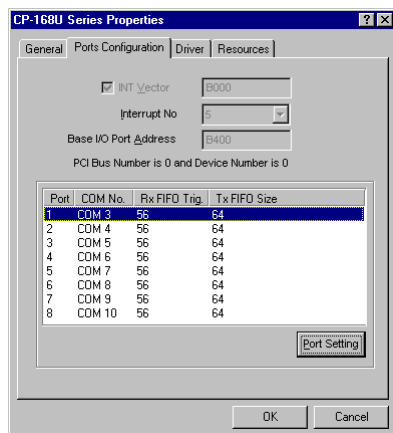
In addition to following the procedures listed below, you may also click on [Start] → [Programs] → [MOXA Utility] → [MOXA Smartio/Industio Configuration Panel] → [Property] → [Port Setting].

Since this is a PCI board, once a new board is added, or an existing board is removed, the board's configuration will be automatically added or removed by the operating system when you restart the PC.

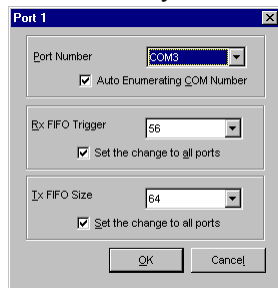
1. Open the [Control Panel], click on the [System] icon, select the [Device Manager] tab, and then click on the plus sign to the left of **Moxa Smartio/Industio multiport board**.
2. Click on the desired CP-168U board, and then click on [Properties].



3. Select the [Ports Configuration] tab, click on the specific port, and then click on the [Port Setting] button.



4. Check the **Auto Enumerating COM Name** check-box to assign continuous COM numbers for subsequent ports. For example, if COM3 is assigned to Port 1, then COM4 will be automatically assigned to Port 2.
5. Re-assign the Rx FIFO Trigger by selecting a number from the pull-down list. Check the **Set the change to all ports** check-box to apply this setting to all ports. Rx FIFO trigger levels from 1 to 62 bytes are available, with a default value of 56 bytes.
6. Re-assign the Tx FIFO Size by selecting a number from the pull-down list. Check the **Set the change to all ports** check-box to apply this setting to all ports. Tx FIFO sizes from 1 to 64 bytes are available, with a default value of 64 bytes.

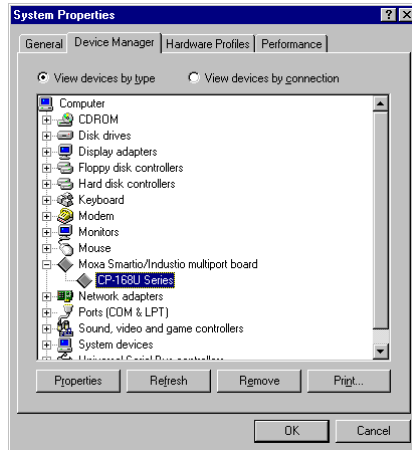


7. To complete the update, click [OK] in the **Port X** dialog box, click [OK] in the **CP-168U board Properties** dialog box, and then click [OK] on the **Device Manager** tab.
8. Restart the system to activate the latest configuration.

Updating the Driver

This section shows how to update the Windows 95/98 driver.

1. Open [Control Panel], click on the [System] icon, and select the [Device Manager] tab.
2. Click on the **MOXA CP-168U board** and then click on [Properties].



3. Select the [Driver] tab.
4. Click on [Update Driver...].

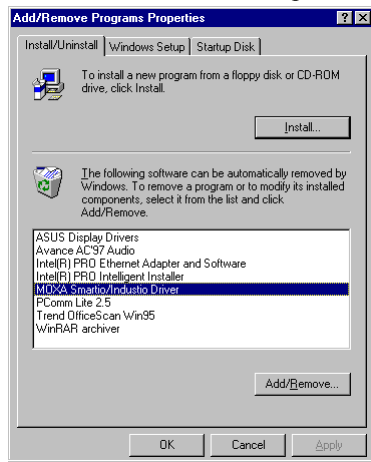


5. Click on [Have Disk...] and type the path of the new driver.
6. Insert the driver CD into the CD-ROM drive, and then click [OK] in the **Install from Disk** window.
7. The system will automatically prompt you to restart the system. Click [Yes] to restart the system, or [No] if you want to reboot the system later.

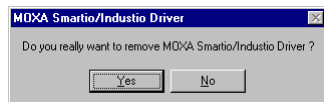
Removing the Driver

This section explains how to remove the *Smartio* CP-168U board driver.

1. Open the [Control Panel], double click the [Add/Remove Programs] icon, and then select the [Install/Uninstall] tab.
2. Click on the **MOXA Smartio/Industio Driver** option and then click on [Add/Remove] to start the driver removal process.



3. Click [Yes] in the following message box to confirm that you want to remove the driver.



4. Click [OK] in the Add/Remove Programs Properties dialog box.



Windows 2000/XP

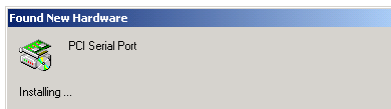
Windows 2000/XP supports up to 256 serial ports, from COM1 to COM256. To fully utilize Windows 2000/XP's multi-process and multi-thread advanced features, pure 32-bit Windows 2000/XP device drivers were developed for the *Industio* CP-168U board and other MOXA multiport boards. The drivers conform to the Win32 COMM API standard.

Installing the Driver

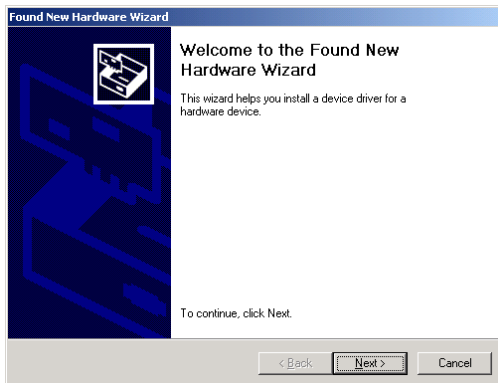
The following procedure shows how to install the *Smartio* CP-168U Series driver for the first time under Windows 2000 and Windows XP. First make sure the board or boards have already been plugged into the system's PCI slot(s).

Windows 2000

1. Windows 2000 can auto-detect new devices, and activate the Found New Hardware function to install a device driver for Plug and Play devices.



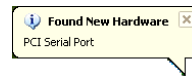
2. Click on **Next** to continue.



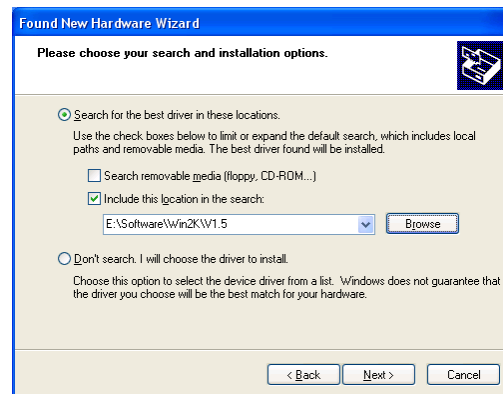
3. Select **Search for a suitable driver...** and then click on **Next** to continue.

Windows XP

1. Windows XP can auto-detect new devices, and activate the Found New Hardware function to install a device driver for Plug and Play devices.



2. Select **Install from a list or specific location**, checkmark **Include this location in the search**, and then click on **Browse**. You should locate the **Software\Win2K\V1.5** folder on the software CD. Click on **Next** to continue.



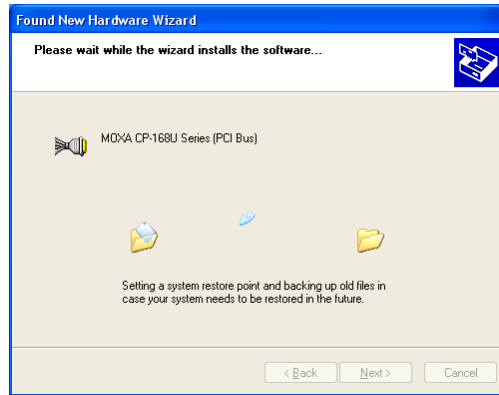
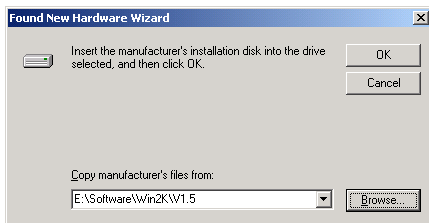
3. Wait while the driver software is installed.



4. Select **Specify a location** and then click on **Next** to continue.



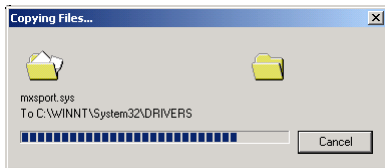
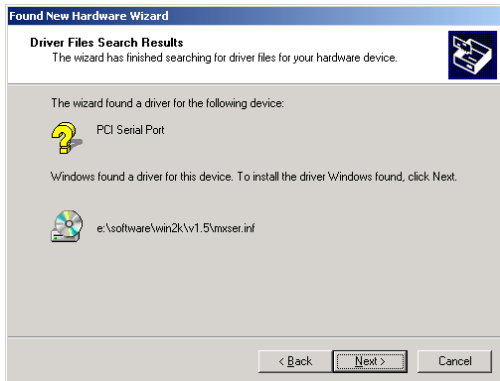
5. Insert the Moxa Driver CD into the CD-ROM drive, and then specify the location of the file as **E:\Software\Win2K\V1.5** as shown below (change the drive letter if needed). Click **OK** to continue.



4. The next window shows the model number of the board, and indicates that Windows has completed the driver installation. Click on **Finish** to continue with the rest of the installation procedure.



- Click **Next** to copy the driver files to your system.

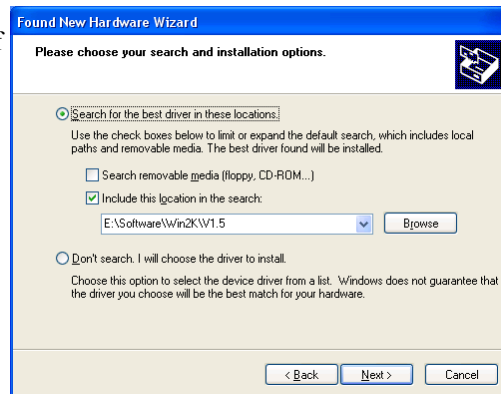


- The next window shows the model number of the board, and indicates that Windows has completed the driver installation. Click on **Finish** to continue with the rest of the installation procedure.

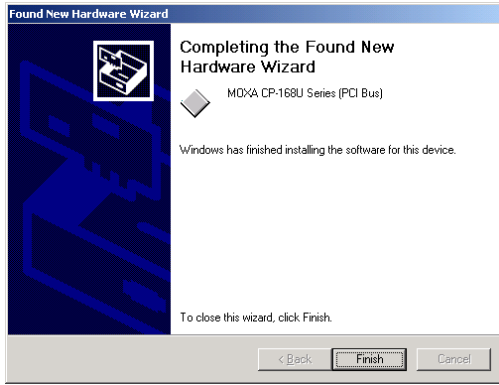
- The next **Welcome to the Found New Hardware Wizard** window that opens starts the port installation procedure. Select **Install the software from a specific location** and then click on **Next** to continue.



- Input the location of the driver in the text input box, or use the **Browse** button to locate the appropriate folder.



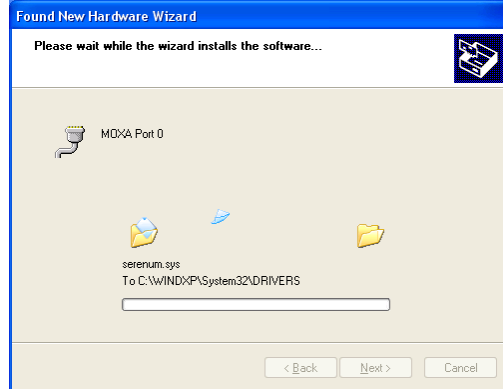
- Wait while the installation wizard searches.



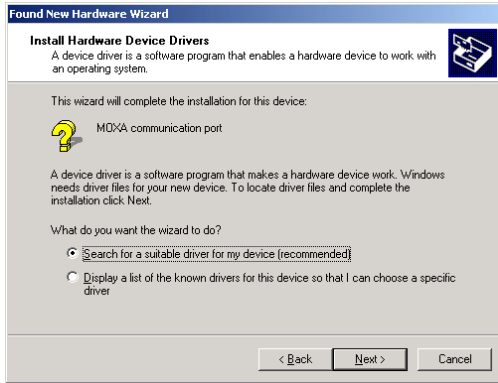
8. The next **Welcome to the Found New Hardware Wizard** window to open starts the port installation stage. Click on **Next** to continue.



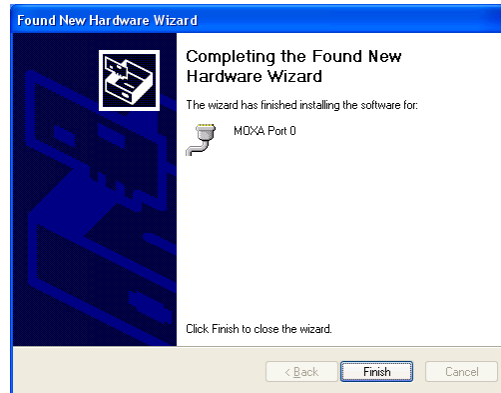
8. Wait while the wizard installs the software.



9. Select **Search for a suitable driver for my device [recommended]**, and then click on **Next** to continue.



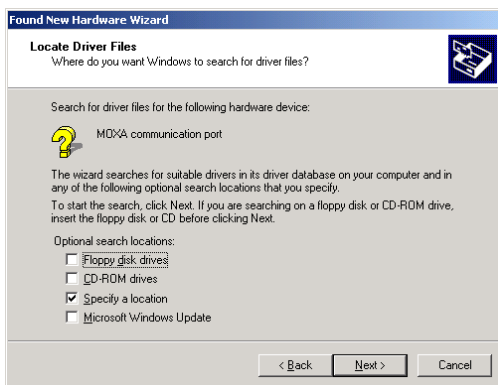
9. After all files have been copied to the system, the **Completing the Found New Hardware Wizard** window will open to indicate that it has finished installing “Port 0.” Click on **Finish** to install the board’s second port.



10. Select **Install the software automatically** and then click on **Next** to continue.



10. Select **Specify a location** and then click on **Next** to continue.

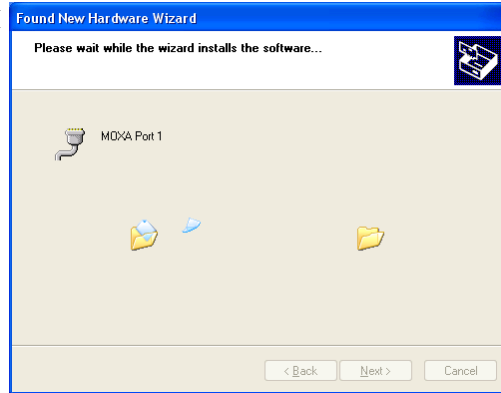
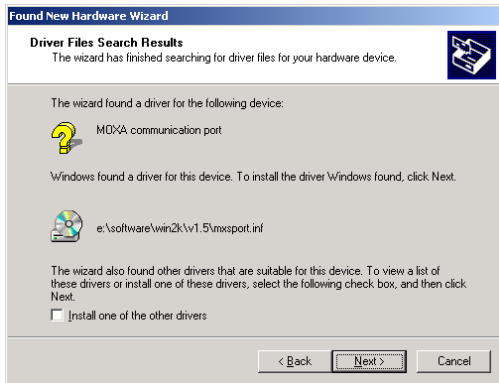


11. Wait while the port is installed.

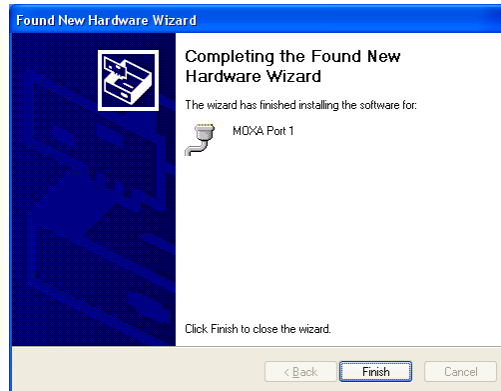
11. Insert the Moxa Driver CD into the CD-ROM drive, and then specify the location of the file as **E:/Software/Win2K/V1.5** as shown below (change the drive letter, if needed). Click **OK** to continue.



12. Click on **Next** to continue with the installation.



12. Click on **Finish** to complete installation of Port 1.



13. After all files have been copied to the system, the **Completing the Found New Hardware Wizard** window will open to indicate that it has finished installing “Port 0.” Click on **Finish** to install the board’s second port.
13. Repeat the above procedure for the rest of the board’s ports. The last window to open completes installation of Port 7.



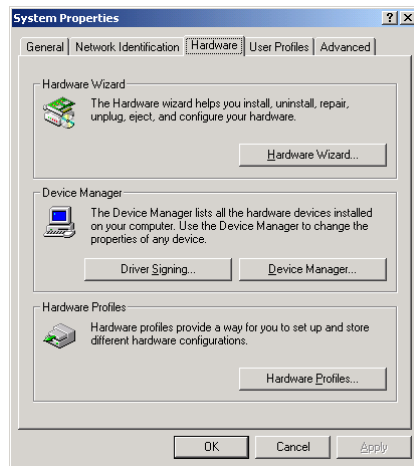
How to Check the Installation

There are three ways to check the installation of the CP-168U Series board.

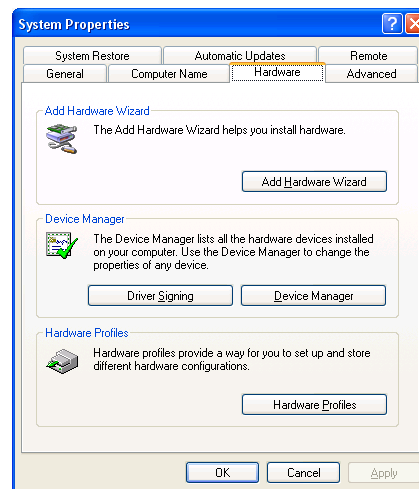
Device Manager

1. You can check the installation of the board by selecting **Start** → **Settings** → **Control Panel** → **System**, select the **Hardware** tab, and then click on the **Device Manager** button.

Windows 2000



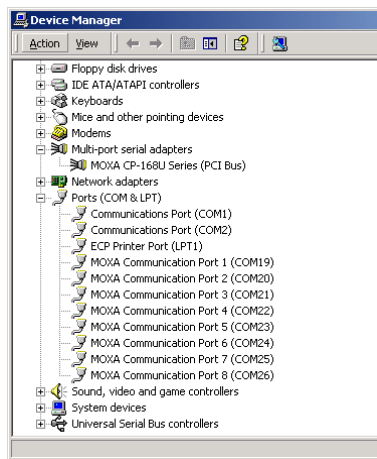
Windows XP



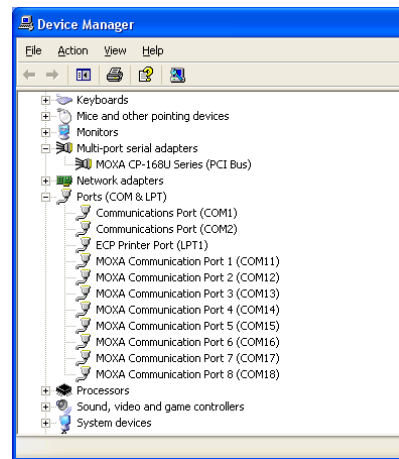
If the driver installation was successful, you will be able to see the model number of the CP-168U board listed under **Multi-port serial adapters**.

You may also expand the **Ports (COM & LPT)** item to check the status of the COM ports. If you see a question mark on top of the icon, then the installation might have a problem. Check the Event Log to determine the reason for the problem.

Windows 2000



Windows XP



MOXA PComm Utility

This utility, which comes with MOXA PComm Lite, provides a convenient way to diagnose problems with Moxa boards, and provides internal and external testing of IRQ, TxD/RxD, UART, CTS/RTS, DTR/DSR, DTR/DCD, etc. This program can verify the correct operation of both the H/W and S/W for all Moxa boards and ports.

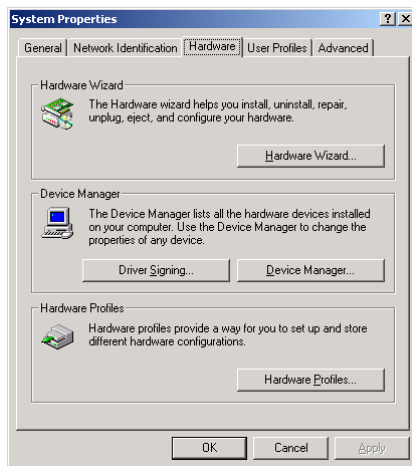
Event Log

To check the Event Log for MOXA boards, click **Start → Settings → Control Panel → Administrative Tools → Event Viewer**, to enter the Event Viewer program. You may find the latest warning message relevant to the Moxa driver in the system category.

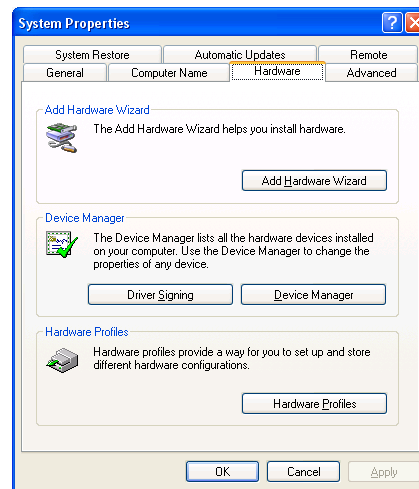
Removing the Driver

You can uninstall the board by first selecting **Start** → **Settings** → **Control Panel** → **System**.

Windows 2000

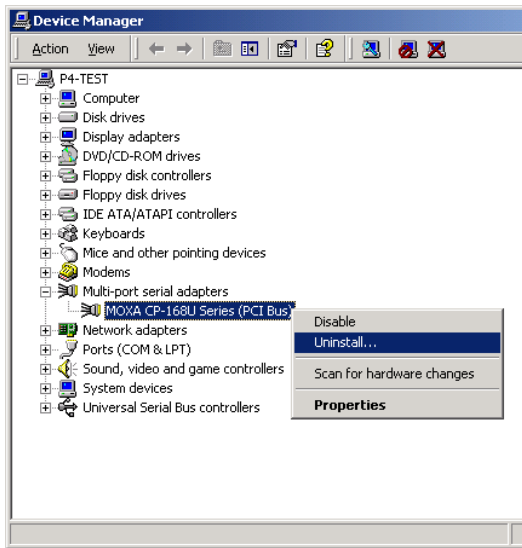


Windows XP

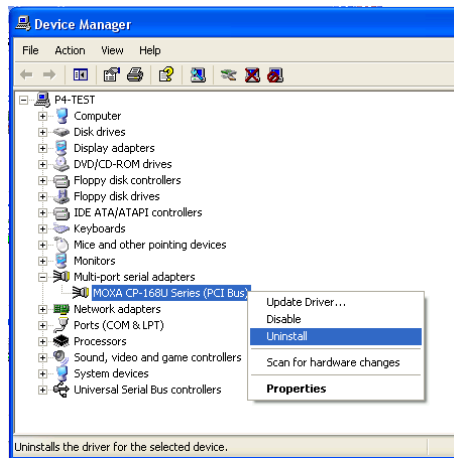


Select the **Hardware** tab, and then click on **Device Manager**. Use the mouse to place the cursor over the CP-168U Series board under Multiport serial adapters, and then click the right mouse button. Select the **Uninstall...** option.

Windows 2000



Windows XP

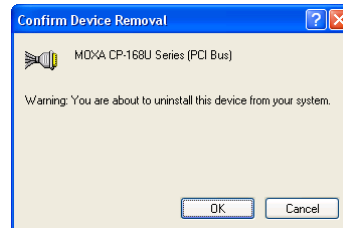


Click **OK** to proceed with the un-installation of the board.

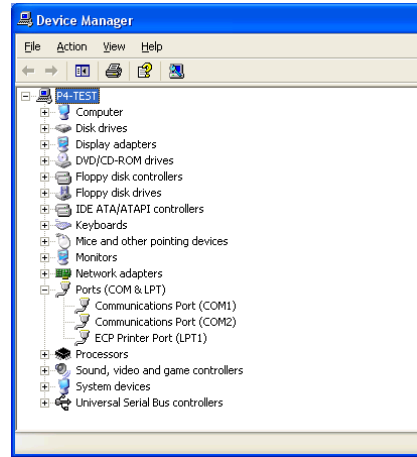
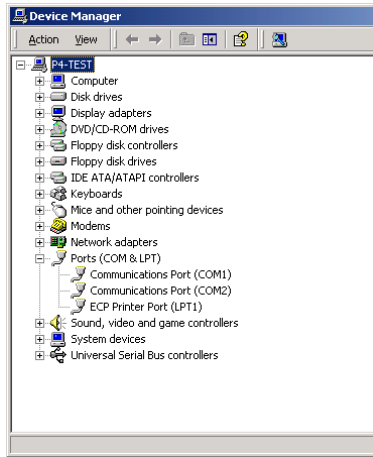
Windows 2000



Windows XP



The **Device Manager** window will automatically refresh to show that the driver and ports for the CP-168U Series board have been removed.



4

Serial Programming Tools

Moxa supports a class of easy to use, yet powerful serial programming libraries and communication troubleshooting utilities under Windows NT/2000/XP and Windows 95/98. Use these MOXA Serial Programming Tools to decrease your software development time.

In the following sections, we describe the installation of the library, and the utilities supported for various programming platforms.

PComm, a professional serial comm tool for PCs, is a software package that runs under Windows NT/2000/XP and Windows 95/98. *PComm* provides:

- A powerful serial communication library for easy programming in the most popular programming languages. The serial communication library is useful for developing applications for data communications, remote access, data acquisition, and industrial control under Windows NT/2000/XP or Windows 95/98. It is a simpler solution compared to the more complex Windows Win32 COMM API.
- Useful utilities such as diagnostic, monitor, and terminal emulator.
- Illustrative sample programs,
- Comprehensive on-line documentation.

***PComm* Installation**

To install *PComm*, run \Setup.exe from the diskette enclosed in the package. Please note that the *PComm* diagnostic and monitor utilities are for MOXA boards only; these two utilities will not work with other manufacturers serial boards.

After *PComm* is successfully installed, click on [Start], select [Program Files], and then *PComm Lite* group to select a list of utilities and documents.

***PComm* Programming Library**

The serial communication library assists you in developing serial communications programs for any COM port that complies with Microsoft Win32 API. It facilitates the implementation of multi-process and multi-thread serial communication programs and hence remarkably reduces development time.

This serial communication library provides a complete function library and sample programs for Visual C++, Visual Basic, and Delphi. To view detailed function descriptions and sample programs, click on [Start] → [Program] → [*PComm Lite*] → [*PComm Lib Help*], [*PComm Porting Notes*] or [*PComm Programming Guide*], or refer to the sample programs in the *PComm* directory.

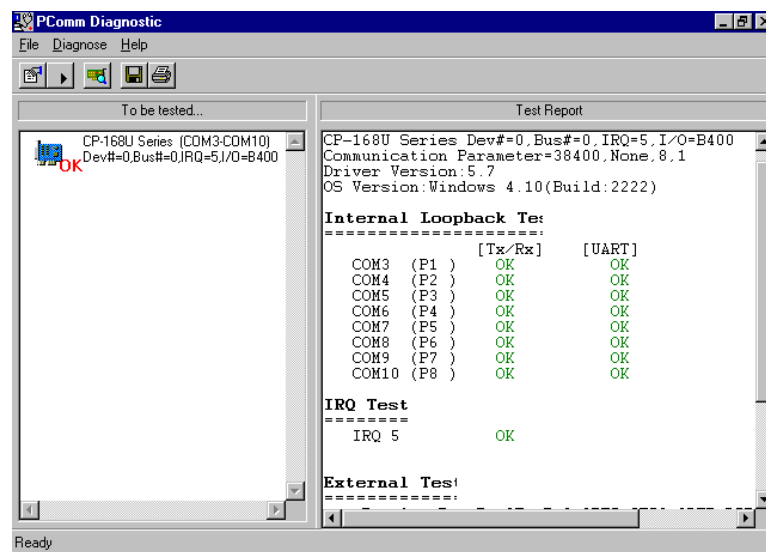
Utilities

In this section, we give brief descriptions of each utility. For more information about these utilities, see the on-line help from the software diskette.

Diagnostic (for MOXA boards only)

A convenient diagnostic program, ONLY for MOXA boards and ports, provides internal and external testing of IRQ, Tx/D/RxD, UART, CTS/RTS, DTR/DSR, DTR/DCD, etc. It allows the user to check the function of both software and hardware.

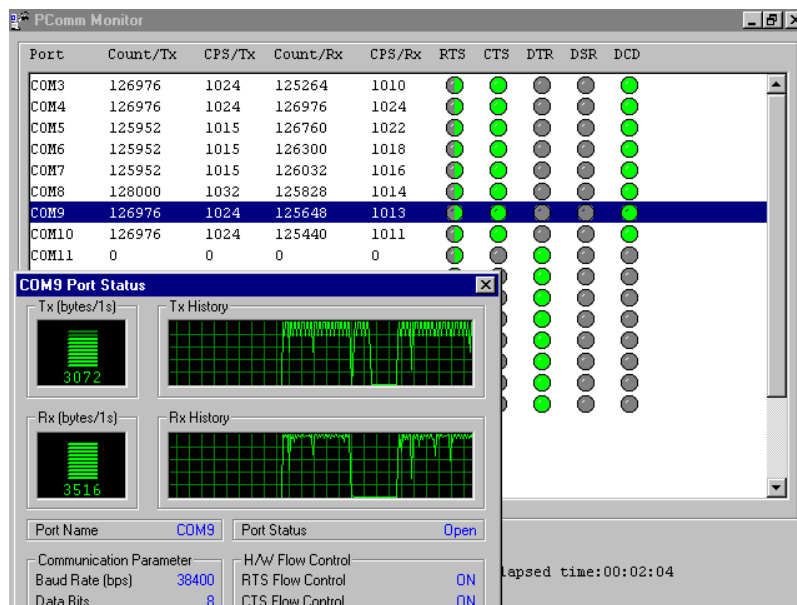
To run the Diagnostic program, click on [Start]→[Program]→[PComm Lite]→[Diagnostic]. A typical test report for the CP-168U Series board is shown below.



Monitor (for MOXA boards under Windows NT/2000/XP)

A useful port status monitoring program allows you to monitor data transmission of selected MOXA COM ports. It monitors data transmission/receiving throughput, and communication line status, with data updated and displayed on the screen at regular time intervals. Click on a specific port to see a graph of the current communication parameters and status of that port.

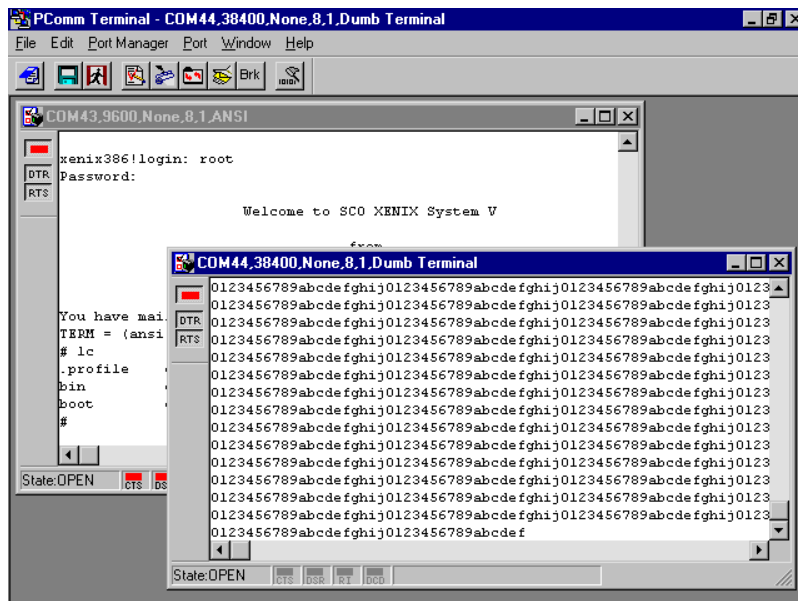
To run the Monitor program, click on [Start]→[Program]→[*PCComm Lite*]→[Monitor].



Terminal Emulator

Terminal Emulator can be used to connect to various ports to see if data transmission is functioning correctly. Terminal Emulator features multi-windows, and supports VT100 and ANSI terminal types. You can transfer data interactively, send patterns periodically, and transfer files using ASCII, XMODEM, YMODEM, ZMODEM, and KERMIT protocols.

To run Terminal Emulator, click on [Start]→[Program]→[PComm Lite]→[Terminal Emulator].



5

Connection Cables and Cable Wiring

In this chapter, we illustrate the possible connections and cable wiring for the CP-168U boards.

In serial data communications, DTE stands for Data Terminal Equipment, such as a PC's COM1/2, serial printers, and terminals, and DCE stands for Data Communication Equipment, such as modems.

RS-232 Cable Wiring

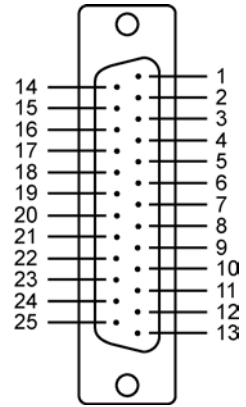
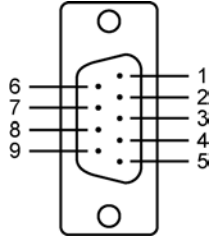
DB62 Female Connector Pinouts									
Port No.	1	2	3	4	5	6	7	8	Signal
Pin No.	1	25	6	30	33	14	38	41	TxD
	22	3	27	8	11	35	16	19	RxD
	44	47	49	52	54	57	60	62	RTS
	43	46	48	51	53	56	59	61	CTS
	2	26	7	31	34	15	39	42	DTR
	23	4	28	9	12	36	17	20	DSR
	24	5	29	10	13	37	18	21	DCD
	32	40	45	50	55	58	GND		

NOTE: The CP-168U board has 1 GND wire that is shared with 6 pins (32, 40, 45, 50, 55, and 58), none of which is assigned to a particular port (since there are 8 ports, but only 6 GND pins). If you are building your own cable, you are free to use any of the GND pins with any of the ports.

Individual Port Pinouts—DB9 and DB25 Male

RS-232

DB9		DB25	
Pin No.	Signal	Pin No.	Signal
1	DCD	2	TxD
2	RxD	3	RxD
3	TxD	4	RTS
4	DTR	5	CTS
5	GND	6	DSR
6	DSR	7	GND
7	RTS	8	DCD
8	CTS	20	DTR



6

Troubleshooting

Common *Smartio* CP-168U board errors and possible corresponding solutions are given below. If the problem still cannot be solved after following these suggestions, contact your dealer or Moxa for help, or use the Problem Report Form at the end of this manual to report problems to your dealer to receive faster technical support.

General Troubleshooting

1. **The MOXA PCI board cannot be detected by the MOXA driver while installing the driver.**

Hardware causes and solutions:

- A. The board is not installed. Please install the board in an empty PCI slot.
- B. The board is not properly plugged into the system's PCI slot. If that is the case, re-plug the board in a 32-bit PCI slot. It may also be the case that the PCI slot is defective. In this case, try other PCI slots until you find one that works.
- C. The motherboard does not have an available IRQ for the CP-168U board. Enter the PC's BIOS and make sure an IRQ setting is available in the PCI/PnP settings.

2. **The MOXA board and driver are activated but cannot transfer (transmit/receive) data.**

Hardware Causes and Solutions:

- A. Make sure the cable wiring is connected correctly. Refer to the "**Connection Cable and Cable Wiring**" chapter to see correct cable connection options.
- B. The cable or the board are probably defective. Please try other ports, cables, or boards to verify this, or use the *PCComm* Diagnostic utility to test MOXA board and port conditions. If Diagnostic reports an error, replace the faulty components.

Software Causes and Solutions:

-
- A. Smartio CP-168U board will check the line status (CTS) before transmitting data if the RTS/CTS flow control feature is set to Enable in the configuration or application program. Refer to the Connection Cable and Cable Wiring chapter for proper wiring options, and check the line status of the suspected port using the diagnostic LED indicators on the mini tester.
 - B. The board's control application might not be correctly written according to the corresponding API of the operating system. To verify the problem, run an existing application known to be good, or use utilities provided by Moxa, such as *Pcomm* Terminal Emulator or HyperTerminal under Windows NT/2000/XP and Windows 95/98.

Windows NT

This section is specific for troubleshooting under Windows NT. For general problems and solutions, please see the previous section, General Troubleshooting.

1. **After the system reboots, the error message, "Another driver in the system, which did not report its resources, has already claimed the interrupt used by xxx," appears in the Event Log.**

This indicates the MOXA board was found, but the IRQ conflicts with another adapter. Check the PCI BIOS IRQ settings first, and then select an IRQ that is available.

2. **After the system reboots, the error message, "Cannot find any configured MOXA Smartio/Industio series board!" appears in the Event Log.**

Make sure the PCI board is seated firmly in the expansion slot.

3. **The COM number of the *Smartio* CP-168U board (Bus No=x, Dev No=x, Port1=COMx), with device number xx, conflicts with others.**

The COM numbers for different boards are in conflict. Change the COM number mappings for the MOXA boards.

4. **Windows NT system panics (blue screen).**

The possible reason is an IRQ or I/O address conflict with other ISA Bus adapters, such as LAN or SCSI boards, or with the system BIOS. Refer to the corresponding problem in the previous section, "General Troubleshooting," for solutions.

Windows 95/98

This section is specific for troubleshooting under Windows 95/98. For general problems

and solutions, see the section, “General Troubleshooting.”

1. The system fails to find the *Smartio* CP-168U board!

- C. The board(s) is (are) not properly plugged into the PCI slot.
- D. The PCI slot is defective. Please try other slots until you find one that works.
- E. The board itself might be defective.

2. After the system reboots, the error message “CP-168U board(BusNo=x, DevNo=x, Port1=COMx) interrupt number is invalid!” appears.

This indicates that the MOXA board was found, but the IRQ conflicts with another adapter. Make sure the MOXA board’s IRQ does not conflict with another adapter’s IRQ. Check the PCI BIOS IRQ settings and then select an available IRQ for the MOXA boards.

A

Technical Reference

Specifications

- Bus interface: 32-bit PCI
- Number of ports: 8
- I/O address: Assigned by PCI BIOS
- IRQ: Assigned by PCI BIOS
- Data bits: 5, 6, 7, 8
- Stop bits: 1, 1.5, 2
- Parity: None, even, odd, space, mark
- UART: Moxa UART (16C550C or compatible)
- Speed: 50 bps to 230.4bps
- Connector: DB62 female
- Data signals: RS-232 — TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
- Surge protection: ESD Max. 1600V
- Operating temp: 0 to 55°C
- Power Requirement 191 mA max. (+5V)
37 mA max. (+12V)
50 mA max. (-12V)
- Dimensions: 136.9 × 100.0 mm (5.39 × 3.94 in)

PCI

The 32-bit *Smartio* CP-168U boards comply with PCI specifications 2.1. Hardware configuration for IRQ and I/O addresses is automatically assigned by the PCI BIOS. Hence, you must first plug in the board before installing the software driver.

Unlike ISA slots, different PCI slots in the same PC may have different bus numbers and device numbers with respect to the PCI specifications. The same PCI board will have different system configurations if moved to a different PCI slot. This is called slot-sensitive or slot-dependent, and may apply to PCI slots in PCs with different motherboards, which might use different device number sets. For example, some use 17, 18, 19, and 20 for identifying the respective PCI slots, whereas some use 11, 12, 13 and 14.

Due to this slot-dependency, it is necessary to re-configure the software driver once the board is plugged into a different PCI slot.

Up to 4 *Smartio* CP-168U boards can be installed in one system. When installing more than one board, remember the order of boards to distinguish the installed boards.

MOXA UART

The MOXA UART is an intelligent asynchronous controller that supports one full duplex channel that simultaneously transfers data at a transmission speed of 230.4 Kbps. To increase overall data throughput, special features such as on-chip FIFO and on-chip hardware flow control are used to reduce the number of interrupts to the onboard CPU, and to prevent loss of valuable data.

Return Procedure

For product repair, exchange, or refund, you must:

- Provide evidence of original purchase.
- Fill out the Problem Report Form (PRF) as detailed as possible for shorter product repair time.
- Obtain a Return Merchandise Authorization (RMA) number from the sales representative or dealer.
- Carefully pack the product in an anti-static package, and send it, pre-paid, to the dealer. The RMA number should be visible on the outside of the package, and include a description of the problem along with the return address and telephone number of a technical contact.